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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,382	06/19/2001	John Erik Lindholm	NVIDP036	4936

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EXAMINER
QUILLEN, ALLEN E

ART UNIT	PAPER NUMBER
2676	9

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/885,382	Applicant(s) LINDHOLM ET AL.	
	Examiner Allen E. Quillen	Art Unit 2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). *6-8* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention by the use of the term "swizzling".

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless - (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 - 8, 10 -18, 20 – 29 and 31 - 34, are rejected under 35 U.S.C. 102(b) as being anticipated by Baldwin, U.S. Patent 5,764,228.

3. Regarding Claim 1, representative of claims 2 - 8, 10 - 18, 20 – 29 and 31 - 34, Baldwin discloses a method for programmable pixel processing in a computer graphics pipeline (Figure 1A-B, 2A-F; Column 7, line 54; Column 20, lines 53-57; Column 3, lines 25-65; Column 33, lines 10-24), comprising: (a) receiving pixel data from a source buffer (Column 41, lines 44-45;

Figure 2A-C, *local buffer;* Column 28, lines 9-15); (b) performing programmable operations on the pixel data (Column 13, lines 53; Column 7, lines 23-25), including texture (fetch, (involves a slope and capable of being used in a level of detail (LOD) calculation, (Column 38, lines 10-15) [minimizing or simplifying geometrical or scene representation] data (Column 8, line 3; Column 58, lines 36-39; Column 35, line 60 through Column 36, line 42; Column 48, lines 1-28; Column 9, lines 1-9; Column 33, line 12 through Column 34, line 20; Column 37, lines 55-61), in order to generate output (Column 1, line 53), wherein the operations are programmable by a user (Column 5, lines 50-58; Column 33, line 29; Column 27, line 38; Column 20, lines 53-57; Column 54, line 27; Column 56, lines 23-27) utilizing instructions from a predetermined instruction set (Column 7, lines 23-25; *unit control, message, possible to select options,* Column 62, line 1 through Column 63, line 10), and the programmable operations support multiple levels of precision (Column 60, lines 1-19) and converting the pixel data from a first level of precision to a second level of precision (Column 60, lines 28 through Column 61, line13; Column 62, lines 14-22, *16-32 bits (SX,TX)*), and removing (negating) the pixel data (*omitting,* Column 38, lines 1-10); and (c) storing the output in a register (Column 13, line 35 through Column 14, line 50; Columns 17-19; Column 55, lines 25-29), includes a color value and a depth value (Column 11, lines 64-67); wherein the operations include a mathematical operation for altering the texture information of the pixel data (*calculates the parameters, texture parameters to interpolate,* Column 60, lines 1-14); utilizing a standard graphics application program interface (API), including OpenGL@ (Column 4, lines 8-35); determining whether the graphics pipeline is (or) is not operating in a programmable mode (see above, Column 10, lines 1-22; Column 5, line 51-58; *decal, Blend or modulate modes,* Column 47, lines 22-30); wherein the pixel data (is selected

from the group consisting of) includes a position, a pixel diffuse color, a specular color, a fog value, and a plurality of texture coordinates (see above, Column 62, lines 30-35; Column 61, line 33); and further comprising performing an operation involving the output, the operation selected from the group consisting of a scissor operation, a color format conversion, an alpha test operation, a z-buffer/stencil operation, a blend operation, a logic operation, a dither operation, and a writemask operation (see above, Figure 2A-F, Column 33, line 25 through Column 34, line 19); wherein the programmable operations are capable of clamping the pixel data for packing the pixel data into a destination (Column 54 line 38 through Column 55, line 25; Column 61, lines 35-40; Column 62, lines 44-51); wherein condition codes are initialized prior to the programmable operations being performed (Column 24, lines 24-28; Column 54, lines 28-33).

4. Regarding claim 9, as best understood by the examiner, Baldwin discloses a method as recited in claim 1, and further comprising swizzling the pixel data prior to performing the programmable operations thereon (see above; Column 40, lines 40-56; Column 52, lines 36-67, *block write, masked block, specified primitive* (object), [realigning BitBlt to speed up access using cycles and reducing pin count]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 19 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldwin, U.S. Patent 5,764,228, as applied to claim 1 above, and further in view of Chan, et al, U.S. Patent 6,163,837.

8. Regarding claim 19, representative of claim 30 (see above), Baldwin discloses a method as recited in claim 1, wherein the programmable operations are selected from the group (*per pixel information held in the localbuffer,* Column 25, lines 45-52) consisting of a no operation (Column 50, lines 5-19; Column 12, lines 25-26; Column 65, line 47), texture fetch (Column 58, lines 36-39), move (Column 43, lines 40-55), derivative (Column 10, lines 38-49; Column 43, lines 40-55), multiply (Column 4, lines 50-55; Column 30, line 2), addition (*sum*, (Column 30, line 2), multiply and addition (Column 30, line 2), reciprocal (1/X), distance [see above, depth, width] vector (*matrix,* Column 4, lines 50-55), minimum, maximum, (Column 27, lines 65 through Column 28, line 5), pack, unpack, (Column 54 line 38 through Column 55, line 25; Column 61, lines 35-40; Column 62, lines 44-51), set on less than (Column 26, line 18), set on greater or equal than (Column 25, lines 53-61; Column 46, lines 42-48), floor (Column 46, line

52), fraction (Column 42, line 40), kill pixel (Column 38, lines 1-10), exponential base two (2), logarithm base two (2), (Column 29, lines 65-67) and light coefficients (Column 1, line 34-38; Column 10, line 14; Column 10, lines 38-49). Baldwin does not disclose reciprocal square root, and dot products. Chan teaches reciprocal square root, and dot products (Column 1, lines 50-53; Columns 11 through 15).

The motivation for combining computer pipelined graphics pixel processing using a industry standard application program interfaces (*OpenGL*@ , and other API's) and programmable operations with matrix data manipulations (reciprocal square root and dot products) is to increase processor throughput when doing two or more instructions (column 1, lines 6 – 13, 22-25, 35-36; Column 2, lines 43-45). Chan is evidence that at the time of the invention it would have been obvious to one skilled in the art of computer graphics processing to combine pipelined graphics pixel processing using programmable operations, as Baldwin discloses, with matrix data manipulations (reciprocal square root and dot products), as Chan teaches, to achieve less pipeline latency, thus faster throughput (Chan, Column 6, lines 9-67) when using two or more instruction execution modes (Column 1, lines 6-13).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen E. Quillen whose telephone number is (703) 605-4584. The examiner can normally be reached on Tuesday – Friday, 8:30am – noon and 1:00 - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Bella, can be reached on (703) 308-6829.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or FAX'd to:

(703) 872-9314 (for Technology Center 2600 only)

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Sixth Floor (Receptionist), Arlington, Virginia

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number (703) 305-9600 or (703) 305-3800.

Allen E. Quillen
Patent Examiner
Art Unit 2676

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June 10, 2003

Matthew C. Bella

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
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